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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|--------------------------------|------------------|
| 09/202,267 | 12/09/1998 | TAKAO NISHIKAWA | P3297B | 2673 |
| 20178 | 7590 | 05/04/2004 | | |
| EPSON RESEARCH AND DEVELOPMENT INC INTELLECTUAL PROPERTY DEPT 150 RIVER OAKS PARKWAY, SUITE 225 SAN JOSE, CA 95134 | | | EXAMINER TUGBANG, ANTHONY D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3729 | |

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/202,267 | NISHIKAWA ET AL. | |
| | Examiner | Art Unit | |
| | A. Dexter Tugbang | 3729 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-10,14,18-20,22-26,30,34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-10,14,18-20,22-26,30,34 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The applicants' amendment filed on 2/6/04 has been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Objections

3. Claims 1 and 18 are objected to because of the following informalities.

In Claim 1, the phrase of "the entire" (line 10) should be recited as --an entire--.

In Claim 18, the phrase of "the entire" (line 8) should be recited as --an entire--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. Claims 1, 6-8, 10, 14, 18, 22-24, 26, 30, 34 and 35 rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent Publication JP 6-23993, referred to hereinafter as JP'993.

JP'993 discloses a method of manufacturing an ink jet head comprising: manufacturing a green sheet 21 (in Fig. 8) in response to a head base 24 (in Fig. 8); the head base comprising a plate in which a nozzle port 26 (in Fig. 14) is formed and a concave portion 27 with a relief pattern defining ink pressure chambers (see final structuring in Fig. 14); coating and solidifying a material for forming the head base on a surface of the green sheet having the relief pattern (see sequence of Figs. 8 and 9); stripping or removing the head base from the green sheet (see sequence of Figs. 11 and 12); and forming the nozzle ports 26 by washing with acetone after

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completely stripping of the head base from the green sheet (see pages 4-5 of English Translation).

Regarding Claims 6-8 and 22-24, JP'993 shows hardening the head base by imparting energy of irradiating light (see arrows in Fig. 11) where the head base 24 is formed from a thermoplastic substance of a photosetting resin (see Constitution).

Regarding Claims 10 and 26, JP'993 shows that the green sheet 21 has the relief pattern with multiple recesses, each being tapered, between the dome-shaped projections on the surface of element 23 (see Fig. 8).

Regarding Claims 14, 30, 34 and 35, JP'993 shows that the nozzle ports 26 are formed by a lithographic method of irradiated light through the use of a resist 22 with the claimed "interface" being read as the top surface of element 23 (in Fig. 11). The "interface" is between the green sheet 21 and the head base 24.

Claim Rejections - 35 USC § 103

5. Claims 2-4, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'993 in view of Trueba 5,560,837.

JP'993 teaches the claimed manufacturing method as previously discussed.

Regarding Claim(s) 2 and 19, JP'993 does not appear to teach that the green sheet is made by forming a resist layer on a substrate of the green sheet and then forming the relief pattern on the substrate of the green sheet by etching.

Trueba teaches a conventional manufacturing process (see Prior Art Figures 1A-1I) that includes forming a resist layer 112 on a substrate 102 of a green sheet 106. Subsequently, the

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green sheet 106 is formed with a prescribed pattern of relief patterns 110, 112 on the substrate 102 of the green sheet by etching (see sequence of Figs. 1E to 1F). The purpose of the above conventional process of Trueba allows the head base 118 to be formed with nozzle ports exiting through the top surface of the head base and concave portions defining ink pressure chambers exiting through the bottom surface of the head base, after the head base is stripped, or completely removed from the green sheet (see Final Structure in Fig. 1I).

It is noted that the final structure of JP'993 also forms a head base 24 with nozzle ports exiting through the top surface of the head base and concave portions defining ink pressure chambers exiting through the bottom surface of the head base (see Fig. 12 or 13 of JP'993).

Regarding Claim(s) 3, 4 and 20, Trueba teaches that the substrate 102 can be made from a silicon dioxide wafer, which would be inclusive of the claimed "silicon wafer", or glass (see col. 2, lines 1-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of JP'993 by forming the green sheet utilizing the conventional prior art manufacturing process of Trueba, to advantageously form art recognized equivalent head bases of an ink jet head having nozzle ports exiting through the top surface of the head base and concave portions defining ink pressure chambers exiting through the bottom surface of the head base.

Regarding Claim 4 and 20, it would have been an obvious matter of engineering design choice to choose any desired substrate material of the green sheet, since applicants' have not disclosed that the claimed green sheet substrate material of a *quartz glass* solves any stated problem or is for any particular purpose and it appears that the invention would perform equally

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well with the glass substrate material taught by Trueba. The green sheets of both JP'993 and Trueba have the same function of being green sheets that are stripped or removed from the head base. Accordingly, it appears that the substrate having the material of "quartz", has no impact on the claimed method steps.

6. Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'993 in view of Moynihan 5,640,184.

JP'993 teaches the claimed manufacturing method as previously discussed. JP'993 does not appear to mention that the thermoplastic substance is more specifically a "hydrated glass".

Moynihan suggests that a head bases, in general, can be made from thermoplastic materials of alumina or *glass* to provide the head base material with a thermal expansion coefficient compatible with adjacent components to be used in operation of an ink jet print head (see col. 14, lines 10-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the head base of JP'993 by forming the head base with thermoplastic materials of glass, as taught by Moynihan, to positively provide a head base with a thermal expansion coefficient compatible with adjacent components to be used in the operation of the ink jet print head.

It is noted that the Applicants recite specific material limitations in Claims 9 and 25, i.e. that the glass is "hydrated". It would have been an obvious matter of design choice to choose any desired type of glass since applicants have not disclosed that the claimed "hydrated glass" solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the material of the head bases taught by either JP'993 or Moynihan.

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Moreover, the limitations of the glass being “hydrated” must result in a manipulative difference in the recited process steps as compared to the prior art. In this instance these material limitations are alternatively held to be obvious in these method of manufacturing claims as such limitation(s) do not result in any difference in the *claimed* manufacturing process.

Response to Arguments

7. The applicants’ arguments filed 2/6/04 have been fully considered, but have not been deemed to be found as persuasive.

In regards to the merits of JP’993, the applicants contend that JP’993 does not teach forming the nozzle ports with an “entire process” after the head base is “completely” stripped from the green sheet.

The examiner most respectfully disagrees and urges the applicants’ to review the English language translation of JP’993, particularly pages 4-5 of the translation. It is noted that the limitations of an “entire process” is a very broad limitation and after the head base 24 is completely stripped or removed from the green sheet 21, JP’993 teaches that the nozzle ports 26 are formed by washing portions of the head base, i.e. the unhardened portions, with acetone. This washing process that forms the nozzle ports would be inclusive of the claimed “entire process” in forming the nozzle ports. It appears that further limitations are needed with respect to the claimed “entire process” in order to avoid JP’993.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

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combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

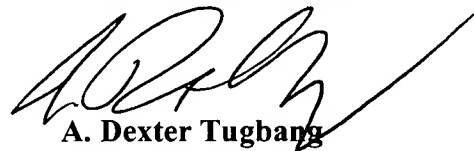
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang
Primary Examiner
Art Unit 3729

May 3, 2004